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Southernmost record and new habitat type for *Eurhopalothrix bruchi* (Santschi, 1922) (Hymenoptera: Formicidae) in Sierra de La Ventana (Buenos Aires, Argentina)

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Abstract: We report a new record of *Eurhopalothrix bruchi* (Santschi, 1922) from a mountain system in central-eastern Argentina. This is the southernmost record for the species, and the first reported from grassland habitats. One worker was collected in a pitfall trap during a survey of the myrmecofauna in Ernesto Tornquist Provincial Park, Buenos Aires, Argentina (38°03′41″ S, 061°59′18″ W; 700 m above sea level), in the summer of 2012–2013. We compile previous records in the Neotropics of this species and update the current geographical distribution.

Key words: ants; Argentina; Attini; distributional range; new record; pitfall trap

Eurhopalothrix (Brown & Kempf, 1960) is a scarcely studied genus of small sized ants. Similar to other genera of cryptic predators such as *Strumigenys*, *Eurhopalothrix* was recently assigned to the tribe Attini that originally and exclusively included fungus growing ants (Ward et al. 2015). *Eurhopalothrix* is found in Southeast Asia, Australia and the Neotropics and represented by 53 known species (Taylor 1980; Longino 2013; Bolton 2016). *Eurhopalothrix* ants are known to inhabit tropical and subtropical environments, and they are typically recorded in forests (Taylor 1980; Longino 2013). The biology of *Eurhopalothrix* ants is poorly known; live colonies are rarely observed probably due to the small body size of individuals and the small size of colonies with few individuals (Hölldobler and Wilson 1990; Longino 2013). They are cryptic predators that feed primarily on small arthropods (Wilson 1956; Wilson and Brown 1984); their specialized setae adhere to the ant body substrate that acts as camouflage when waiting for the prey (Hölldobler and Wilson 1986).

The 28 described Neotropical species all live in rainforests, and are captured almost exclusively in leaf litter, soil, and rotten wood (Longino 2013). Specifically, *Eurhopalothrix bruchi* (Santschi, 1992) is one of the smallest species of the genus. Only a few workers have been captured, and no living colonies have yet been found. In the literature, two synonyms include *Rhopalothrix bruchi* and *Basiceros bruchi* (Bolton 2016). Most records of *E. bruchi* are from the Atlantic Forest ecoregion (Figure 1; Table 1). There are two records outside tropical and subtropical forests; one is a specimen collected under a stone in a xeric forest located in the ecotone between the Espinal and Dry Chaco ecoregions in Argentina (Santschi 1922); and the other, is a recently found record from the Brazilian Caatinga (Ulysséa and Brandão 2013). Until now, these findings constituted the only records of this species from outside of tropical-subtropical forests.

Here, we report a new record for *E. bruchi* that enlarges the currently known geographical distribution in the southern Neotropics. This record also is the first time this species has been found in temperate grassland.

The study was conducted in Ernesto Tornquist Provincial Park in central-eastern Argentina (38°03′41″ S, 061°59′18″ W), which is one of the few areas for the conservation of Pampean grasslands. The park protects 48.76 km^2 of land that includes the headwaters of three watersheds (Gil et al. 2014) and mountains from 450 m to nearly 1,200 m above sea level (Figure 1). The Organismo Provincial para el Desarrollo Sostenible of the Province of Buenos Aires gave permission and regulated ant collection in Ernesto Tornquist Provincial Park. Mountains within the park are part of the Ventania system, which is about 170 km long and maximally 65 km wide, covering over 7,100 km^2 (Vargas-Gil and Scoppa 1973), and between 280 and 500 million

years old (Martínez 2001). The climate in the area is temperate, with mean annual temperature of 15° C and mean annual rainfall of 700 mm (Kristensen and Frangi 1995b). The mountain system is immersed in the Southern Pampas phytogeographic district. Vegetation is dominated by steppe grasses, composed by large and spread clumps of *Stipa* species (Cabrera 1971). The Sierra de La Ventana system holds high numbers of endemics

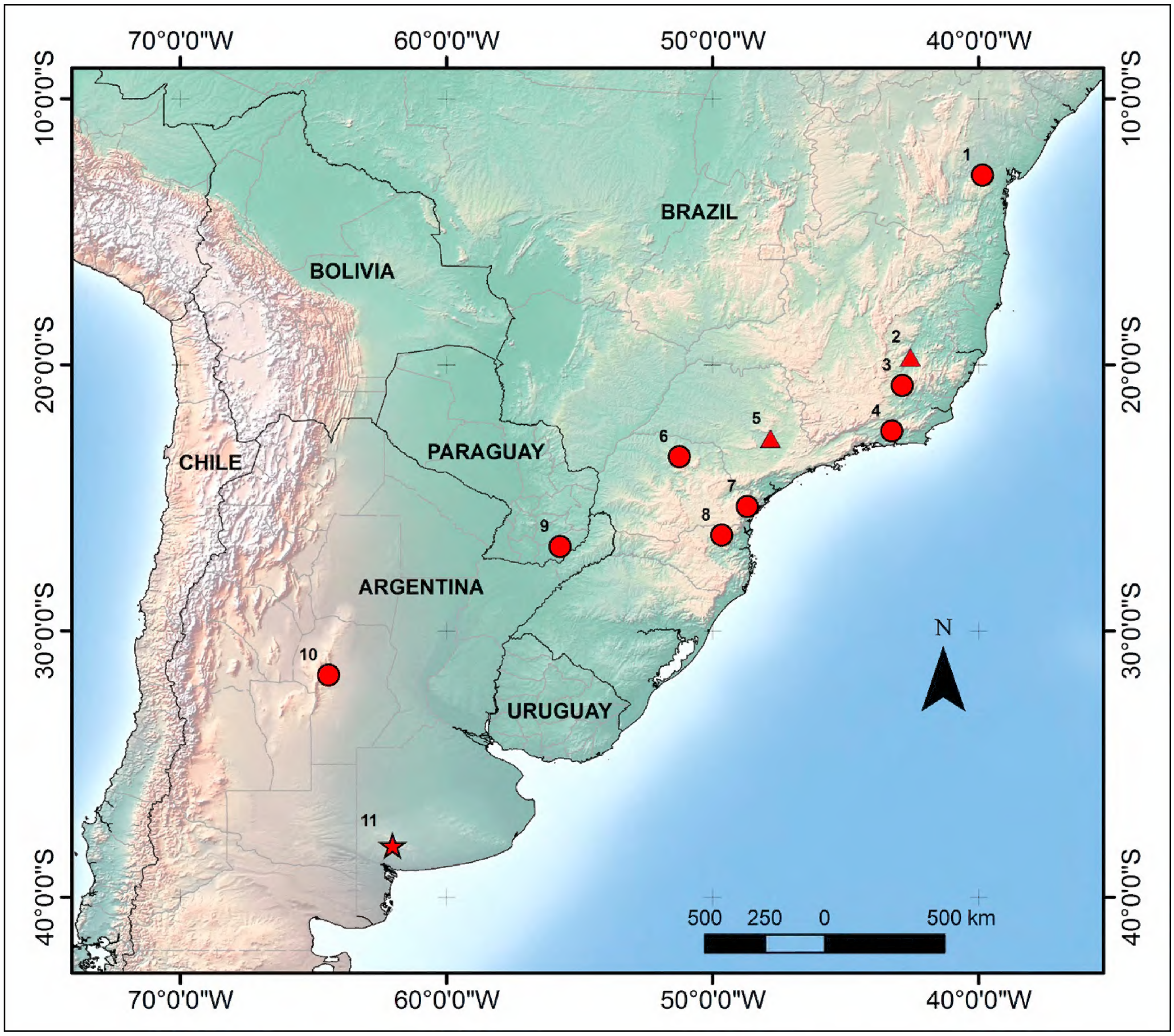
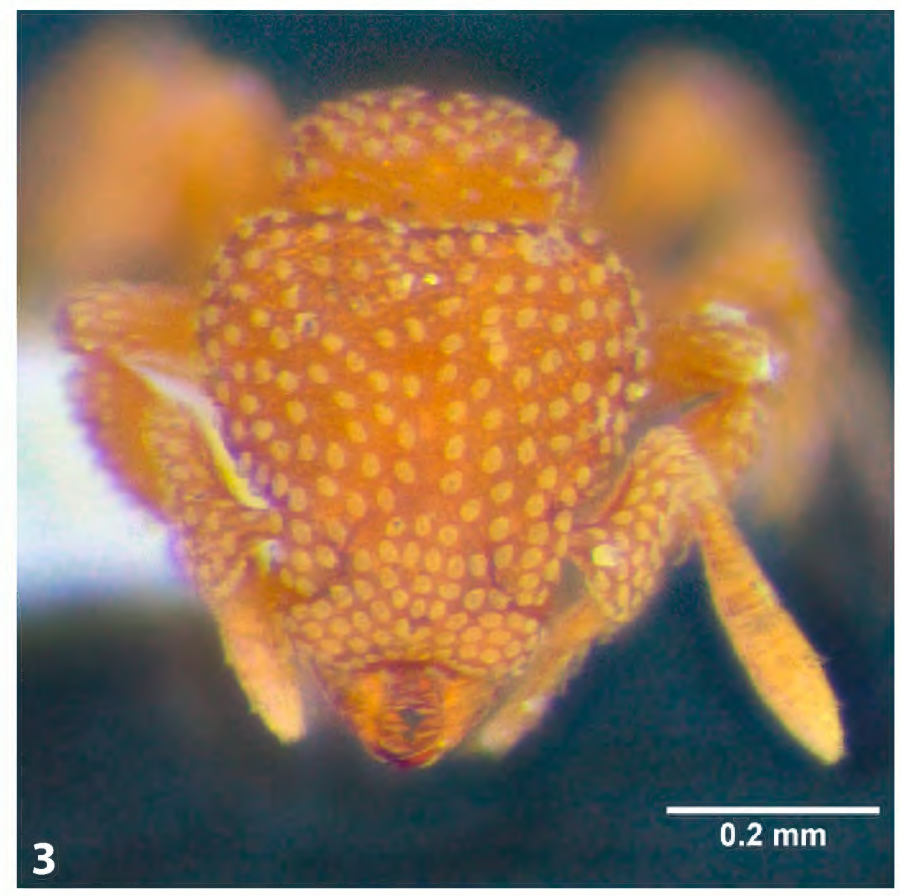


Figure 1. Geographical distribution of *Eurhopalothrix bruchi* in South America. Confirmed locations are marked with a circle, unconfirmed ids locations with a triangle, and the new record in Sierra de La Ventana is marked with a star. Numbers indicate the references cited in Table 1.

Table 1. Known records of *Eurhopalothrix bruchi*, indicating the country, state and ecoregion of collection; synonym and literature references. Numbers correspond to Figure 1. Unconfirmed identifications detailed with "prox." in name.

#	Country	State	Ecoregion	Synonym	Reference
1	Brazil	Bahía	Caatinga	*Eurhopalothrix bruchi*	Ulysséa and Brandão (2013)
2	Brazil	Minas Gerais	Atlantic forest	*Eurhopalothrix prox. bruchi*	Castro et al. (2012)
3	Brazil	Minas Gerais	Atlantic forest	*Eurhopalothrix bruchi*	AntWeb (2016b)
4	Brazil	Río de Janeiro	Atlantic forest	*Basiceros bruchi*	Orsolon-Souza et al. (2011)
5	Brazil	São Paulo	Atlantic forest	*Eurhopalothrix prox. bruchi*	Macedo et al. (2011)
6	Brazil	Paraná	Atlantic forest	*Eurhopalothrix bruchi*	Lopes et al. (2010)
7	Brazil	Paraná	Atlantic forest	*Eurhopalothrix bruchi*	Bihn et al. (2008)
8	Brazil	Santa Catarina	Atlantic forest	*Basiceros bruchi*	Ulysséa et al. (2011)
9	Paraguay	Itapúa	Atlantic forest	*Eurhopalothrix bruchi*	Wild (2007)
10	Argentina	Córdoba	Espinal	*Rhopalothrix bruchi*	(Santschi, 1922)
11	Argentina	Buenos aires	Pampa	*Eurhopalothrix bruchi*	This study



Figures 2 and 3. Specimen captured of *Eurhopalothrix bruchi* **2:** lateral view. **3:** Full-face dorsal view of the head.

from many taxa (Kristensen and Frangi 1995a; Marrero et al. 2008).

Ant collections were conducted during the summer, from December 2012 to March 2013. We established six altitudinal levels from 450 m to 1,000 m, and set 10 pitfall traps at each 50 m altitudinal level, for a total of 60 traps. The methodology was adapted from Fisher (2004) and Sanders et al. (2007). Pitfall traps consisted on plastic containers (500 ml volume, 85 mm diameter) partially filled with 150 ml of propyleneglycol:water (1:2) solution and inserted flush with the ground.

At each sampling site, vegetation was characterized within a 1×1 m square following the modified Braun Blanquet scale for plant growth forms (Braun-Blanquet et al. 1979). Thus, percentage cover was visually estimated, classifying all plants within four grow forms (grasses, herbaceous dicots, ferns, and bushes); percentage cover of leaf litter and stones was also estimated.

Captured ants were identified to species or morphospecies following keys to genus by Fernández (2003) and the key to New World *Eurhopalothrix* species by Longino (2013). The trapping system collected 23,896 ant specimens, including a single worker of *Eurhopalothrix bruchi*. Similar to other *Eurhopalothrix* ants, the specimen had the eyes above the antennal groove, a triangular mandible and seven segments in the antenna (Fernández 2003). Diagnostic characteristics of our specimen were consistent with descriptions of *E. bruchi* (Brown and Kempf 1960; Longino 2013): Face including clypeus, dorsal mesosoma, first gastral tergite and legs covered with abundant and homogeneous ground pilosity of appressed spatulate setae; posterior face of propodeum with broad lamella, without propodeal spine; head widh = 0.43mm (Figures 2 and 3). To confirm the identification, it was compared with the photograph of the type specimen (Alta Gracia, Argentina; CASENT0912536) found in AntWeb (2016a).

The specimen was captured at 714 m above sea level (a.s.l.) (38°03′41″ S, 061°59′18″ W) (Figure 1) and deposited in the Collection of Community Ecology and Macroecology Laboratory at University of Buenos Aires, catalogue code SAS0248.

This is the most southern record for the genus *Eurhopalothrix* and *E. bruchi* and is 700 km from the nearest previous record in Alta Gracia, Cordoba (31°39′10″ S, 064°25′51″ W). The altitude capture (714 m a.s.l.) was equivalent to another record from Brazil (AntWeb 2016b). While the exact site of capture was not available for other records, generally the study areas covered from 50 m to 1,200 m a.s.l. (Wild 2007; Ulysséa and Brandão 2013) (Figure 1). The record we report here is also the second record of the species for Argentina, and the first for Buenos Aires province. This find expands the currently known geographical distribution of the species, extending it further south in the Neotropics. Although, it is possible that central Argentina was always part of the original geographical range of *E. bruchi*, on the other hand, the range may be expanding as a consequence of human activities and local movements. Cryptic ants are one of the most transferred functional groups because they are very difficult to detect and have small and inconspicuous nests (McGlynn 1999; Suarez et al. 2010). In this case, the establishment of the colonies may benefit from locally increasing temperatures and precipitation (Del Toro et al. 2015) due to climate change, as seen in the study area (Barros et al. 2015).

This is the first record for the species in grassland steppes. Previous records of *E. bruchi* were from forests, mostly in the Atlantic Forest biome. At the capture site

Figure 4. Overview of soil cover at the sampling site where the specimen was captured (38°03′41″ S, 061°59′18″ W) and surroundings at about 700 m a.s.l. in Ernesto Tornquist Provincial Park.

of the specimen, vegetation cover was 40% grasses and 30% herbaceous dicots; the remaining 30% consisted of 10% leaf litter and 20% stones. Similar soil-cover types were observed at about 700 m a.s.l. in other sites of the Ventania Mountains (Figure 4). The new find may imply that the ecological niche of *E. bruchi* includes a greater variety of habitat types than previously known. Although pitfall traps are not the most efficient method to capture cryptic ants of the tribe Attini (Brown and Kempf 1960; Longino 2013), they did allow for the detection of *E. bruchi* in a new region and biome. We expect that more appropriate sampling techniques for cryptic ant species will provide further information on *E. bruchi* and other *Eurhopalothrix* species and add to our knowledge of the distribution and life history of these ants.

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